

In the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-46 (Canceled)

47. (previously amended) A hardened voyage recorder for use on a marine vessel, comprising:

- (a) a first module including a mountable base mountable on the marine vessel and containing electronics for receiving data from data sensors located on the marine vessel and for writing data to a memory module;
- (b) a removable memory module removably coupled to said first module, said memory module including
 - (i) an outer housing including an inner cavity for containing a solid state memory;
 - (ii) a cover for said outer housing;
 - (iii) a thermal insulator located within said inner cavity defining at least a portion of a second interior cavity, with said solid state memory being located within said second inner cavity; and
 - (iv) a boiler located within said second interior cavity including a containment compartment for containing a thermal mass, a protective compartment within which said solid state memory is located and means for interconnecting said containment compartment and said protective compartment, wherein said

means for interconnecting, when open,
provides a passageway between said
containment compartment and said
protective compartment.

48. (previously amended) The apparatus as set forth in claim 47 wherein solid state memory includes BGA memory.

49. (previously amended) The apparatus as set forth in claim 47 wherein said solid state memory is stacked memory.

50. (previously amended) The apparatus as set forth in claim 47 wherein said boiler includes a cover plate which covers said protective compartment, said cover plate defines a through hole spaced apart from its edge, and said solid state memory is coupled to a cable which extends through said through hole.

51. (previously amended) The apparatus as set forth in claim 50 wherein said through hole is substantially circular.

52. (previously amended) The apparatus as set forth in claim 50 wherein said cover plate is press fit to said boiler.

53. (previously amended) The apparatus as set forth in claim 47 wherein said thermal mass includes a phase change material (PCM).

54. (previously amended) The apparatus as set forth in claim 53 wherein said PCM utilizes the energy absorption from vaporization to absorb heat.

55. (previously amended) The apparatus as set forth in claim 53 wherein said PCM is water.

56. (previously amended) The apparatus as set forth in claim 55 wherein said water is contained in a dry material which inhibits the water from freezing or expanding.

57. (previously amended) The apparatus as set forth in claim 56 wherein said dry material comprises sponge, silica, polyacrylamide, calcium silicate or pottery clay.

58. (previously amended) The apparatus as set forth in claim 47 wherein said thermal mass is a dry powder formed by combining water and silica.

59. (previously amended) The apparatus as set forth in claim 47 wherein said thermal mass absorbs shock.

60. (previously amended) The apparatus as set forth in claim 59 wherein said thermal mass is a gel formed by combining water and polyacrylamide.

61. (previously amended) A boiler as set forth in claim 47 further comprising a fusible valve that opens at a predetermined temperature to allow said thermal mass to flow through said passageway.

62. (previously amended) A boiler as set forth in claim 61 wherein said fusible valve comprises at least one thermal vent plug which is released at a predetermined temperature.

63. (previously amended) A boiler as set forth in claim 62 wherein said thermal vent plug comprises wax, paraffin, a bismuth alloy or electrical solder.

64. (previously amended) The apparatus as set forth in claim 57 wherein said cover for said outer housing is coupled to said outer housing with a snap ring.

65. (previously amended) The apparatus as set forth in claim 64 wherein said cover for said outer housing is coupled to said outer housing with two snap rings.

66. (previously amended) The apparatus as set forth in claim 47 wherein said outer housing withstands a penetration of a 100mm 250kg projectile at three meters.

67. (previously amended) The apparatus as set forth in claim 47 wherein said outer housing will withstand a 50g s, 11 ms half sine shock.

68. (previously amended) The apparatus as set forth in claim 47 wherein said outer housing will withstand an immersion of 6,000 meters depth.

69. (previously amended) The apparatus as set forth in claim 47 wherein said solid state memory is protected from temperatures on the order of 260°C for approximately ten hours.

Claims 70-79 (canceled)

80. (previously amended) A hardened voyage data recorder, comprising:

(a) a removable memory subsystem having a lower flange;

(b) a mounting base subsystem having an upper flange; and

(c) a quick release clamp engaging said upper flange and said lower flange whereby said memory subsystem and said base subsystem are removably coupled to each other.

81. (previously amended) A hardened voyage data recorder according to claim 80, wherein:

said quick release clamp has two quick release levers.

82. (previously amended) A hardened voyage data recorder according to claim 80, wherein:

said mounting base subsystem includes at least one watertight cable connector.

83. (previously amended) A hardened voyage data recorder according to claim 80, wherein:

said mounting base subsystem includes a first watertight cable connector for coupling with a power supply and a second cable connector for coupling with a data source.

84. (previously amended) A hardened voyage data recorder according to claim 80, wherein:

one of said upper flange and said lower flange has a groove adapted to receive an O-ring.